

THAT WHICH IS CLAIMED:

1. An extrusion auger comprising one or more auger segments that are removable from an auger shaft in a forward direction along an axis of the auger shaft, wherein the removal is facilitated by a pulling tool, the auger segment comprising:
  - an auger hub that includes a bore to engage the auger shaft and an outer surface opposite the bore, wherein the auger hub defines a forward end;
  - at least a portion of a flight joined to the outer surface of the auger hub; and
  - at least one engaging surface defined by the auger hub, the engaging surface having at least a portion thereof facing in a generally axial direction away from the forward end of the auger hub to allow the pulling tool to contact the engaging surface and thereby pull the auger segment along the axis of the auger shaft to facilitate removal of the auger segment from the auger shaft.
2. An extrusion auger according to claim 1, wherein the bore of the auger hub includes at least one keyway protrusion located radially inward of the bore for positioning in a keyway of the auger shaft.
3. An extrusion auger according to claim 2, wherein the engaging surface is axially located forward of the keyway protrusion.
4. An extrusion auger according to claim 2, wherein the keyway protrusion includes a radial surface and a bottom surface.
5. An extrusion auger according to claim 1, wherein the engaging surface is radially located between the bore and the outer surface of the auger hub.
6. An extrusion auger according to claim 1, wherein the engaging surface is generally perpendicular to the axis of the auger shaft.
7. An extrusion auger according to claim 1, wherein the auger hub includes two engaging surfaces that are symmetrically located at diametrical positions.

8. An extrusion auger comprising one or more auger segments that are removable from an auger shaft in a forward direction along an axis of the auger shaft, wherein the removal is facilitated by a pulling tool, the auger segment comprising:

an auger hub that includes a bore to engage the auger shaft and an outer surface opposite the bore, wherein the auger hub defines a forward end;

at least a portion of a flight joined to the outer surface of the auger hub;

at least one recess in the forward end of the auger hub, wherein the recess includes an engaging surface; and

an access way in the forward end of the auger hub to allow the pulling tool to contact the engaging surface through the access way and thereby pull the auger segment along the axis of the auger shaft to facilitate removal of the auger segment from the auger shaft.

9. An extrusion auger according to claim 8, wherein the bore of the auger hub includes at least one keyway protrusion located radially inward of the bore for positioning in a keyway of the auger shaft.

10. An extrusion auger according to claim 9, wherein the recess is axially located forward of the keyway protrusion.

11. An extrusion auger according to claim 9, wherein the keyway protrusion includes a radial surface and a bottom surface.

12. An extrusion auger according to claim 8, wherein the access way and the recess are radially located between the bore and the outer surface of the auger hub.

13. An extrusion auger according to claim 8, wherein the engaging surface is generally perpendicular to the axis of the auger shaft.

14. An extrusion auger according to claim 8, wherein the auger hub includes two recesses that are symmetrically located at diametrical positions.

15. An extrusion auger apparatus, comprising:
  - an auger shaft having an axis;
  - one or more auger segments comprising:
    - an auger hub that includes a bore to engage the auger shaft and an outer surface opposite the bore, wherein the auger hub defines a forward end;
    - at least a portion of a flight joined to the outer surface of the auger hub;
  - and
  - at least one engaging surface defined by the auger hub, the engaging surface having at least a portion thereof facing in a generally axial direction away from the forward end of the auger hub; and
  - a pulling tool having a flanged end, wherein the flanged end of the pulling tool can contact the engaging surface to facilitate removal of the auger segment from the auger shaft in a forward direction along the axis of the auger shaft.
16. An extrusion auger apparatus according to claim 15, wherein the auger shaft includes a keyway and the bore of the auger hub includes at least one keyway protrusion for positioning in the keyway of the auger shaft.
17. An extrusion auger apparatus according to claim 16, wherein the engaging surface is axially located between the access way and the keyway protrusion.
18. An extrusion auger apparatus according to claim 16, wherein the keyway protrusion includes a radial surface and a bottom surface.
19. An extrusion auger apparatus according to claim 15, wherein the engaging surface is radially located between the bore and the outer surface of the auger hub.
20. An extrusion auger apparatus according to claim 15, wherein the engaging surface is generally perpendicular to the axis of the auger shaft.
21. An extrusion auger apparatus according to claim 15, wherein the auger hub includes two engaging surfaces that are symmetrically located at diametrical positions.

22. A pulling tool for removing an auger segment from an auger shaft of an extrusion auger in a forward direction along an axis of the auger shaft, the pulling tool comprising:

a rod having a forward end, wherein the rod defines an outside surface; and a flanged end at an end of the rod opposite the forward end, the flanged end extending radially beyond the outside surface of the rod;

wherein the flanged end is structured and arranged to contact an engaging surface of a recess of the auger segment to facilitate removal of the auger segment from the auger shaft.

23. A pulling tool according to claim 22, wherein the flanged end defines a contacting surface that contacts the engaging surface of the auger segment, wherein the contacting surface is generally perpendicular to the axis of the rod.

24. A method of removing an auger segment from an auger shaft of an extrusion auger in a forward direction along an axis of the auger shaft, the method comprising the steps of:

advancing a pulling tool axially along the auger shaft;  
passing a flanged end of the pulling tool through an access way in the forward end of the auger segment;  
contacting a flanged end of the pulling tool with an engaging surface of a recess of the auger segment; and  
pulling the pulling tool to remove the auger segment from the auger shaft.

25. A method according to claim 24, wherein the passing step comprises the step of rotating the pulling tool so that the flanged end of the pulling tool passes through the access way.

26. A method according to claim 24, wherein the advancing step further comprises the steps of:

positioning the pulling tool into a keyway of the auger shaft; and  
advancing the pulling tool axially along the keyway.